FIG. 1a

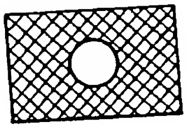


FIG. 1b

FIG. 1c

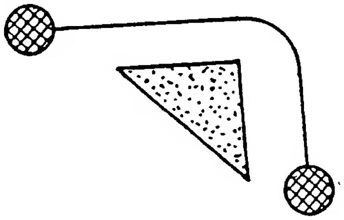


FIG. 1d

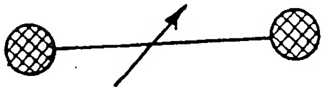


FIG. 1e

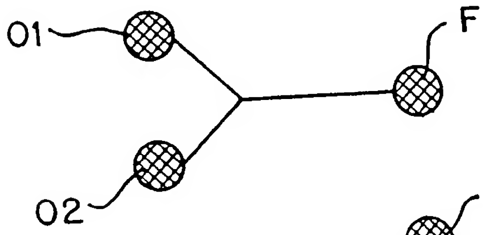


FIG. 1f

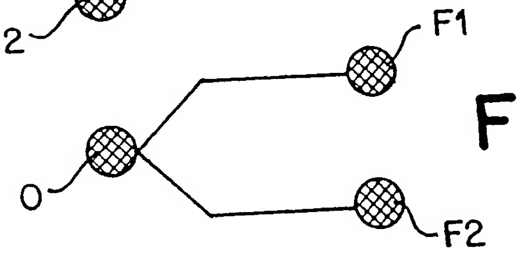


FIG. 1g

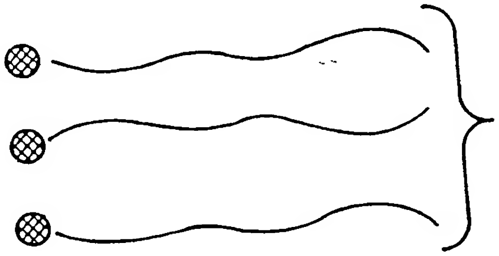


FIG. 1h

FIG. 2A

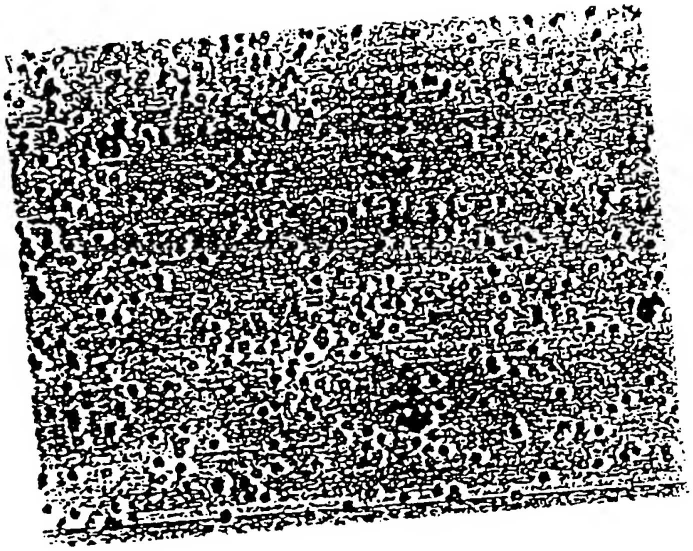


FIG. 2B

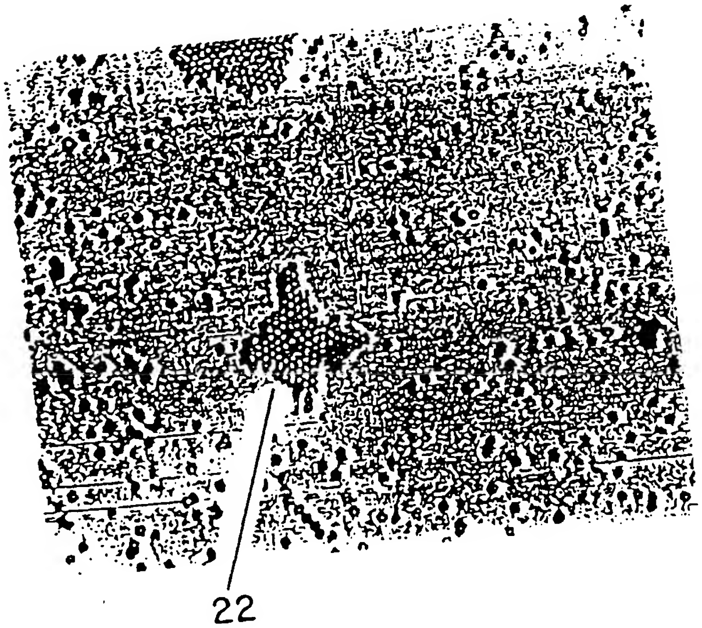


FIG. 2C

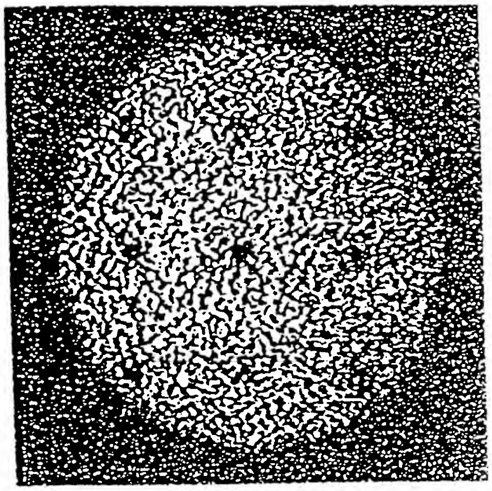


FIG. 2D

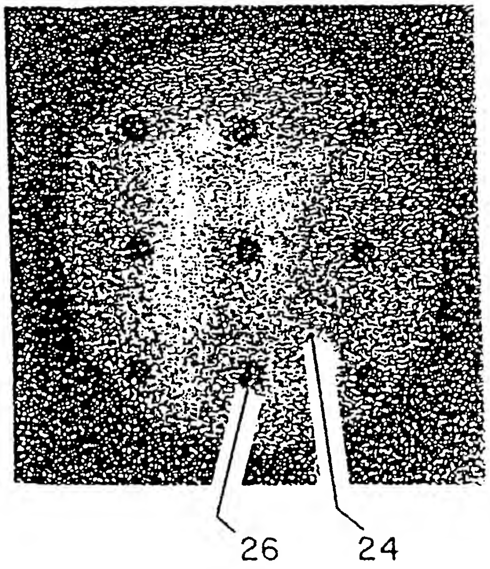


FIG. 3a

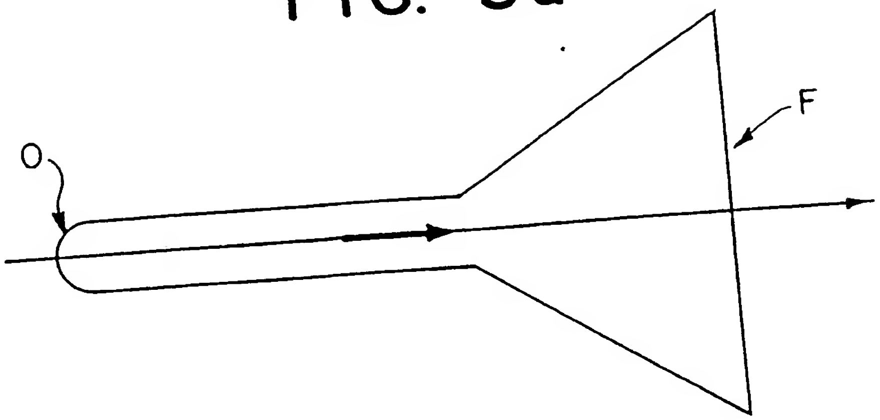


FIG. 3b

FIG. 3c

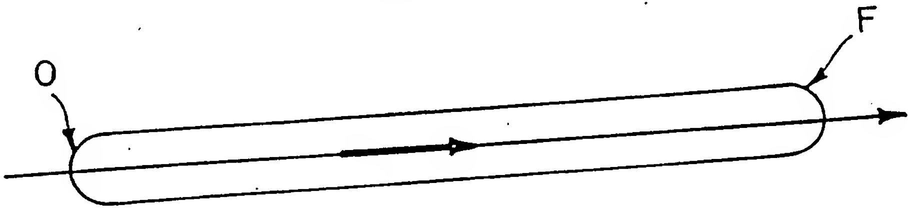


FIG. 3d

FIG. 3C

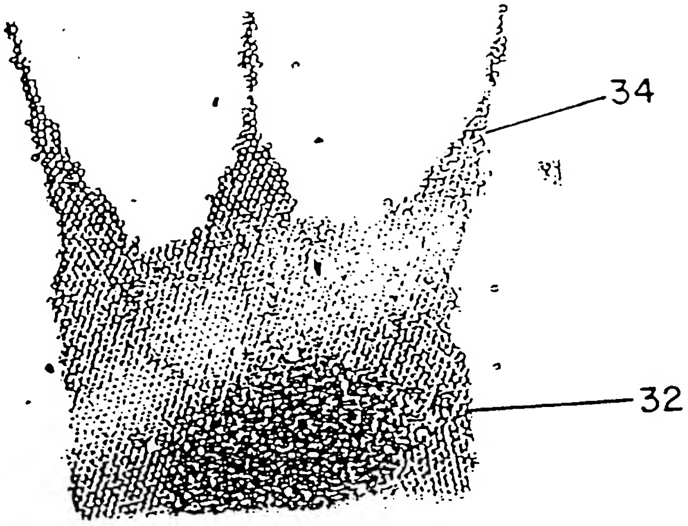


FIG. 3D

FIG. 4A

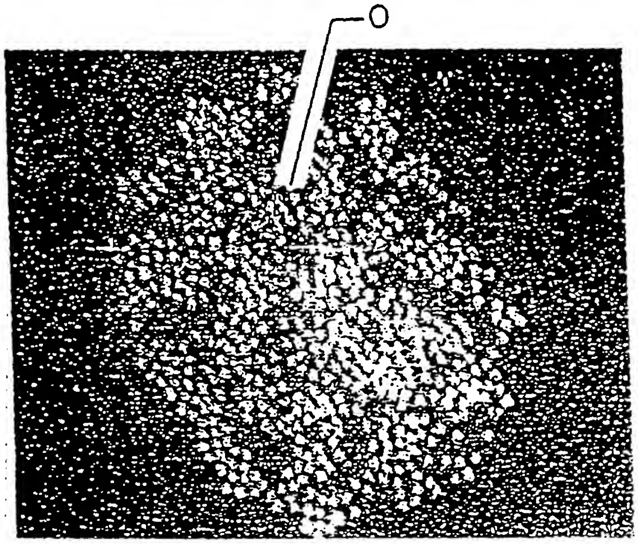


FIG. 4B

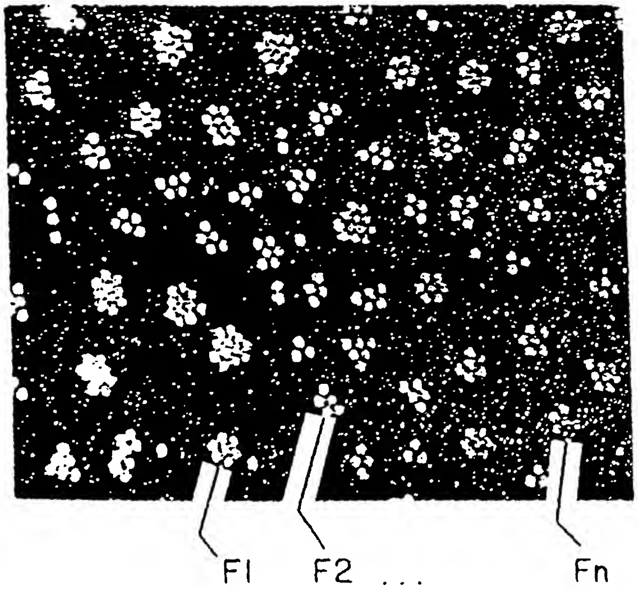
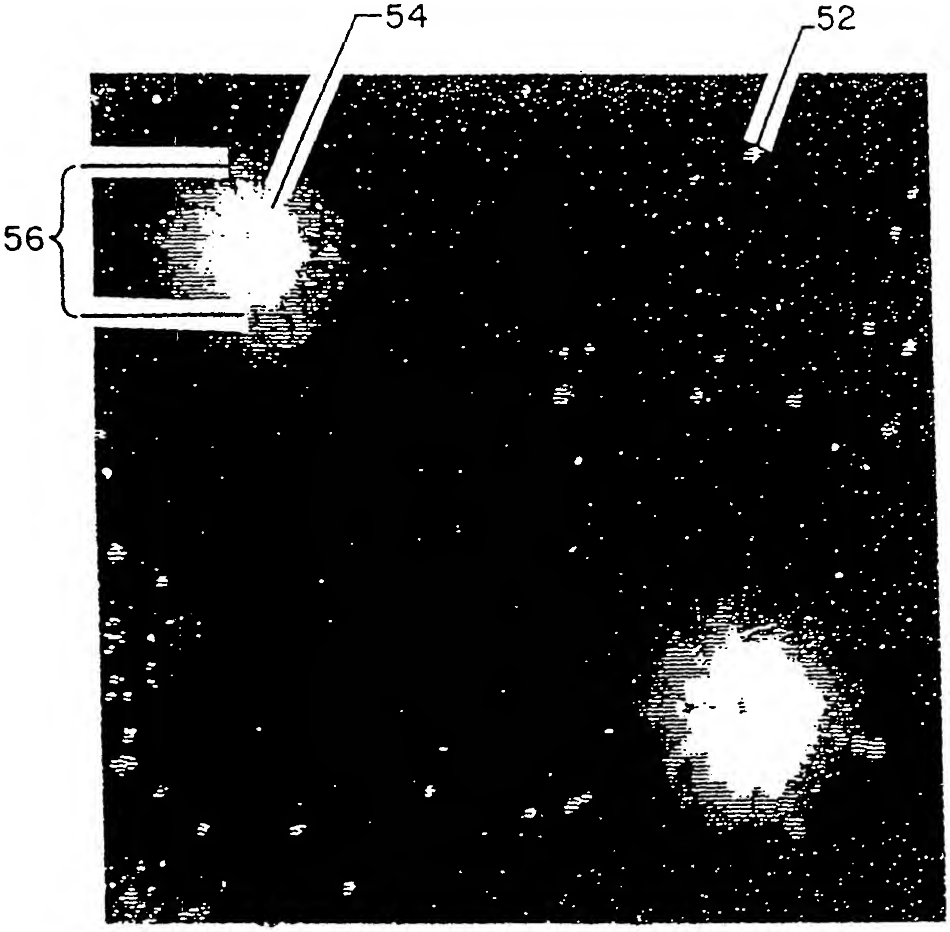


FIG. 5



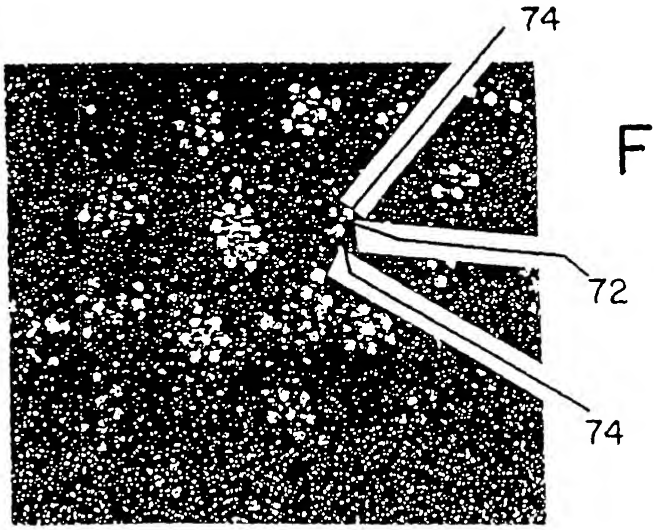


FIG. 7

FIG. 6a

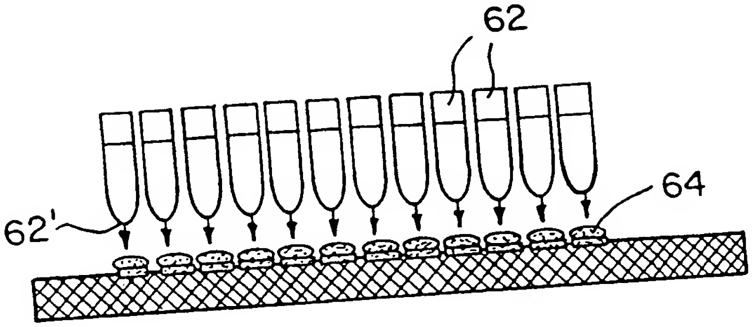


FIG. 6b

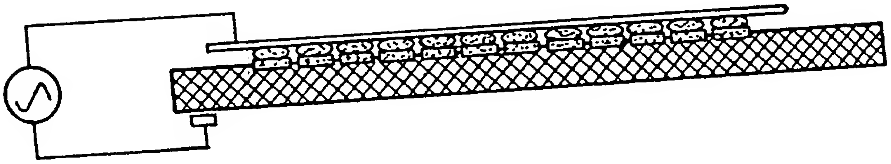


FIG. 6c

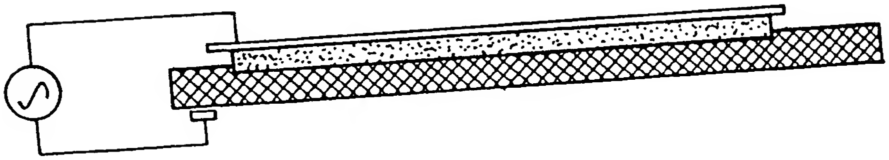


FIG. 8

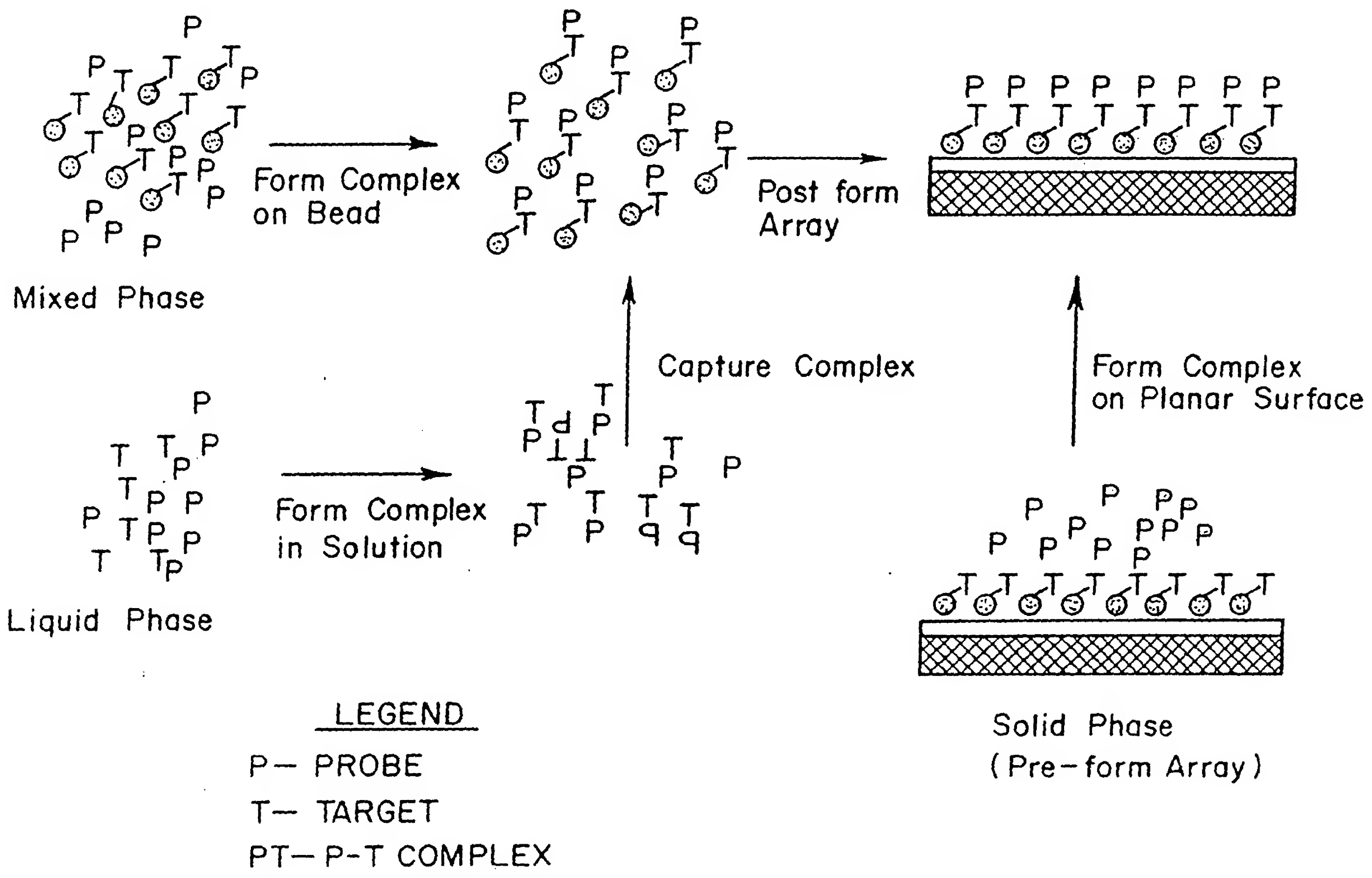

Mixed Phase
Form Complex on Bead
Post form Array
Capture Complex
Liquid Phase
Form Complex in Solution
Form Complex on Planar Surface
Solid Phase
(Pre-form Array)
LEGEND
P— PROBE
T— TARGET
PT— P-T COMPLEX

FIG. 9a

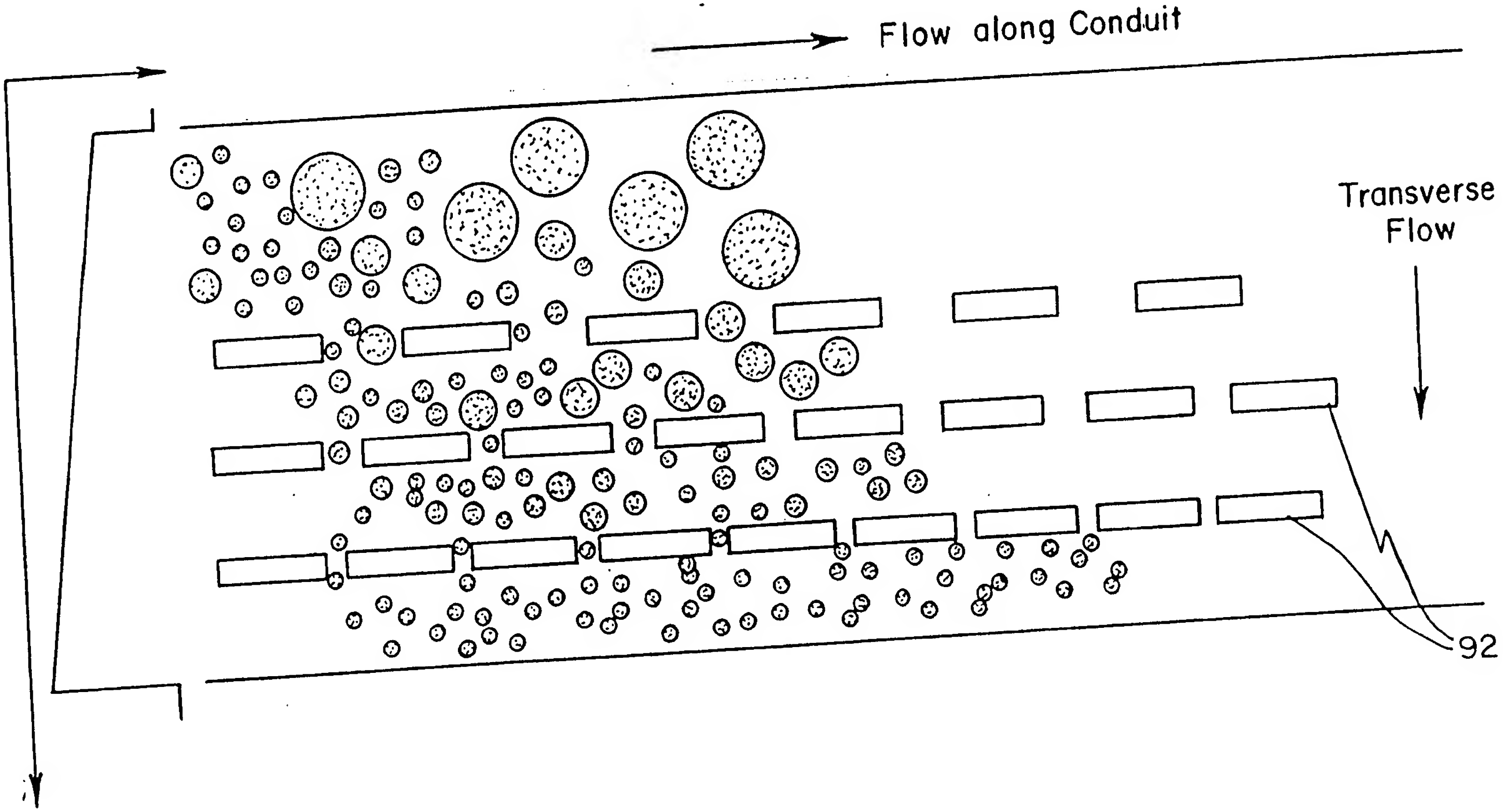


FIG. 9b

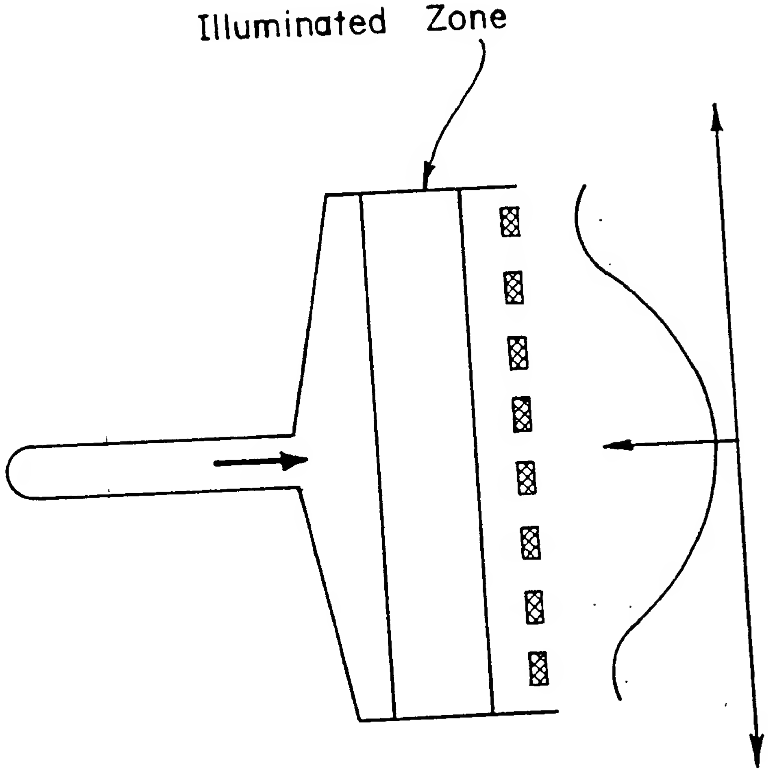


FIG. 9c

FIG. 10

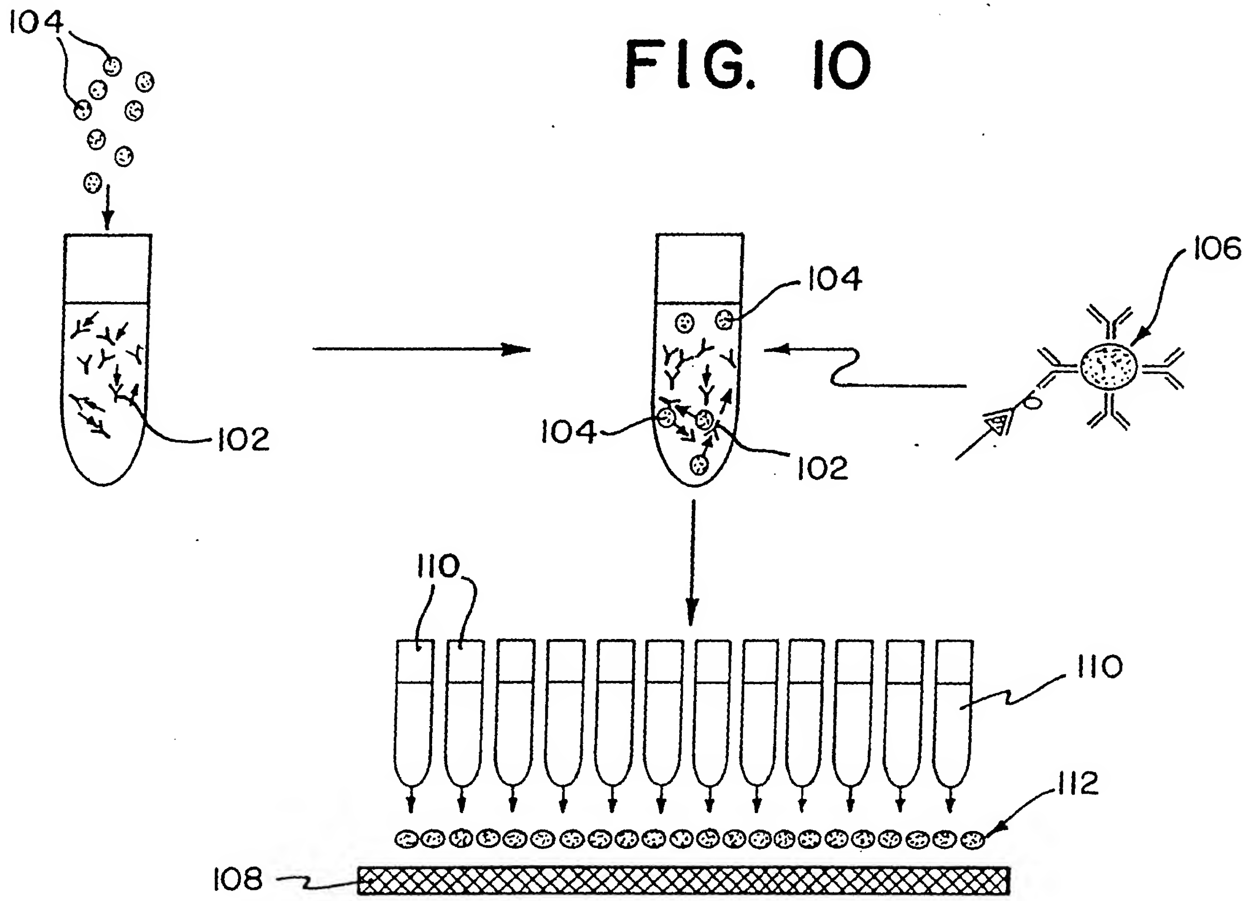


FIG. 11a

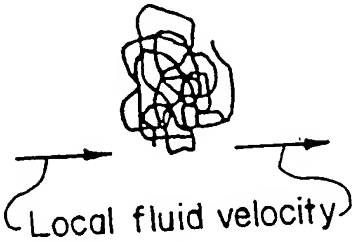


FIG. 11b

FIG. 11c

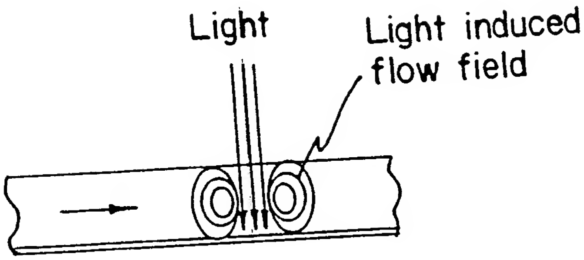


FIG. 11d

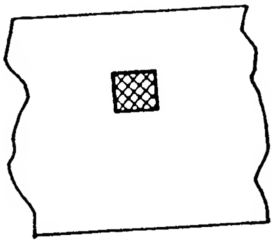
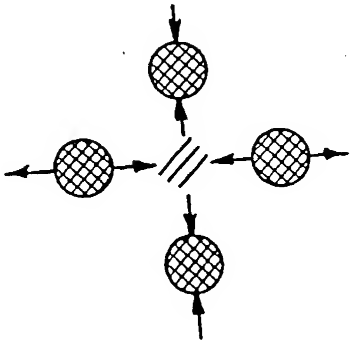


FIG. 11e



ILLUMINATION PATTERN GENERATOR

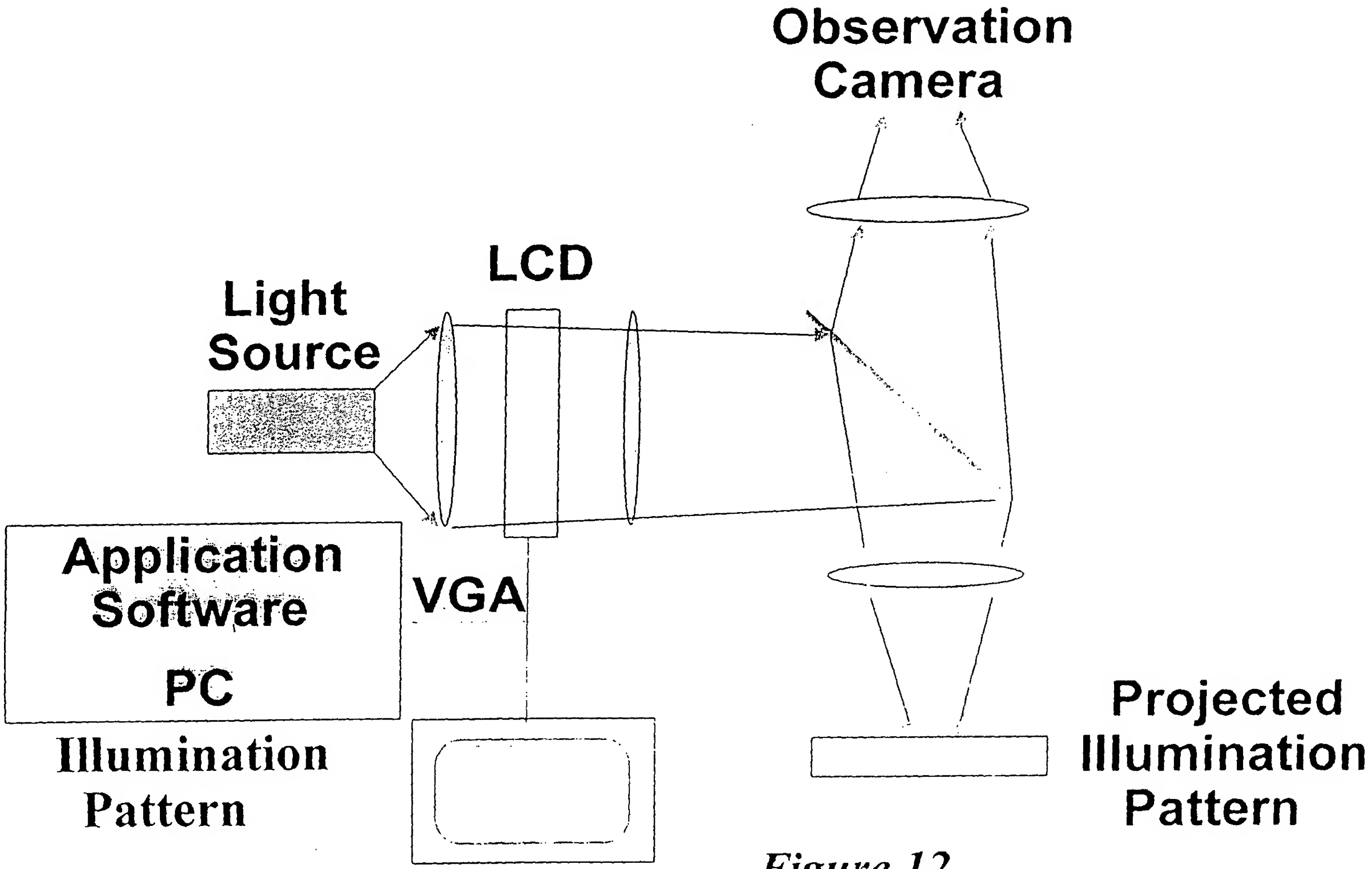


Figure 12

LCD-PARSE OPTICAL DESIGN

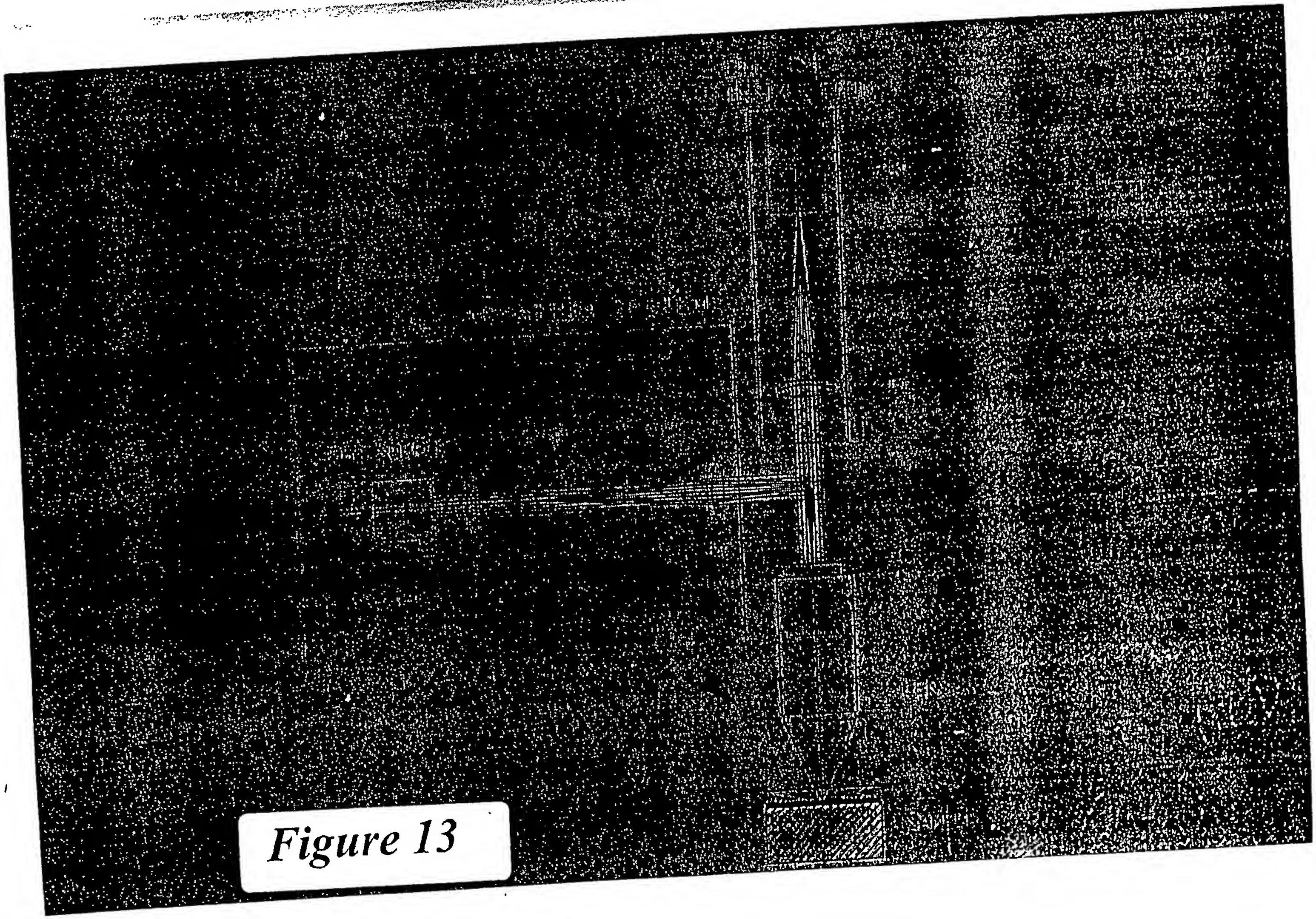


Figure 13

ARRAY SHAPE ADJUSTMENTS

CIRCLE

Figure 14a

HORIZONTAL. LINE

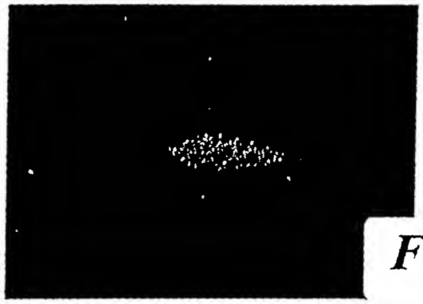


Figure 14c

Figure 14b

VERTICAL LINE

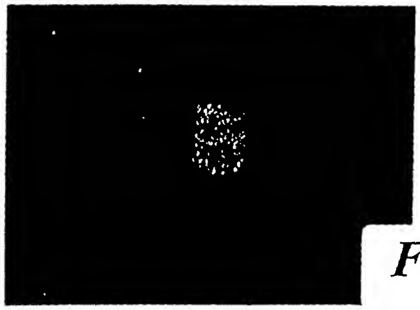
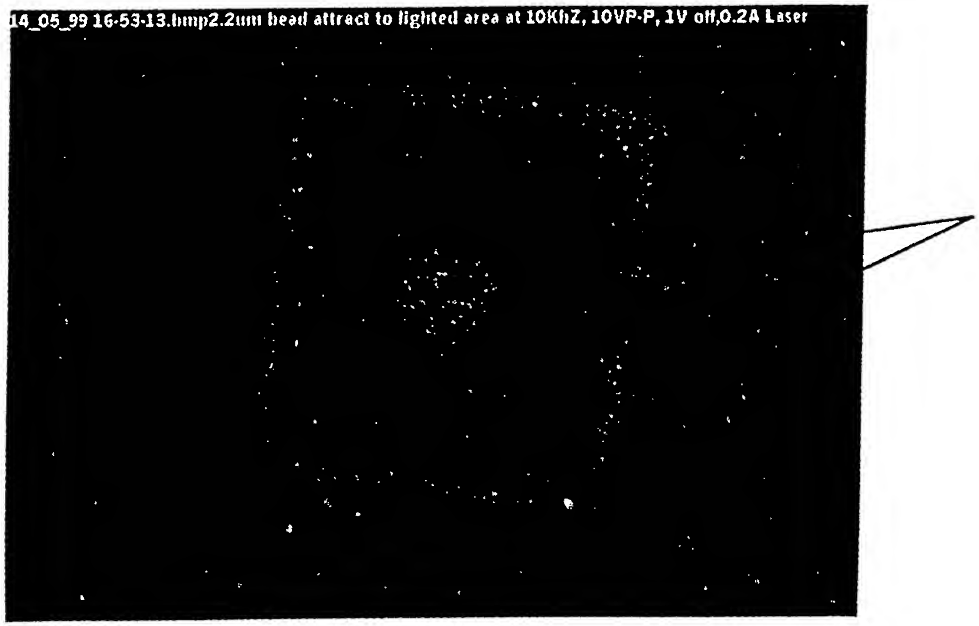


Figure 14d

SQUARE

COLLECTION AND ARRAY ASSEMBLY



CollectedParticles

Figure 15a

EXPULSION AND CONFINEMENT

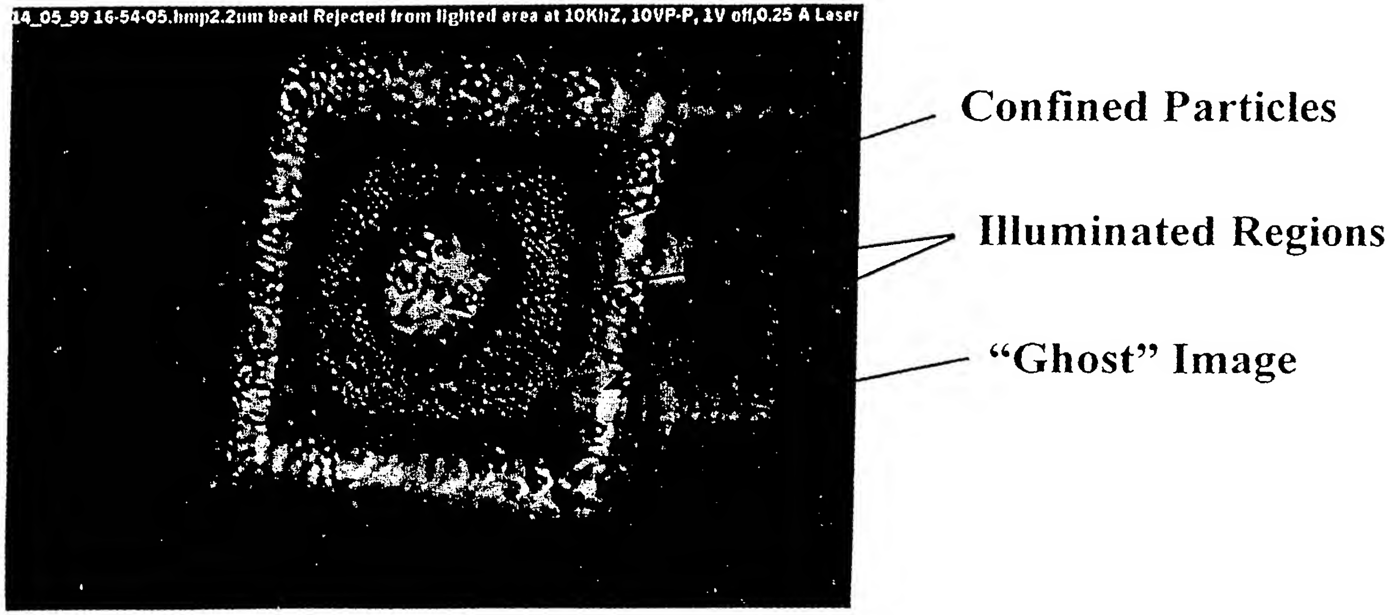


Figure 15b

DRAG AND DROP

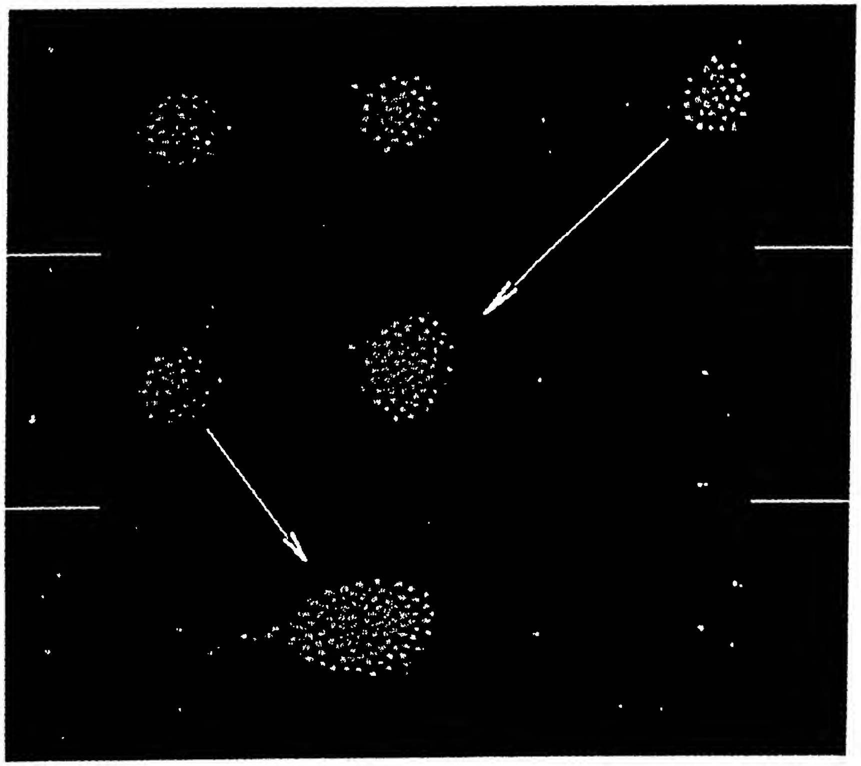


Figure 16

Programmable Array Reconfiguration and Segmentation

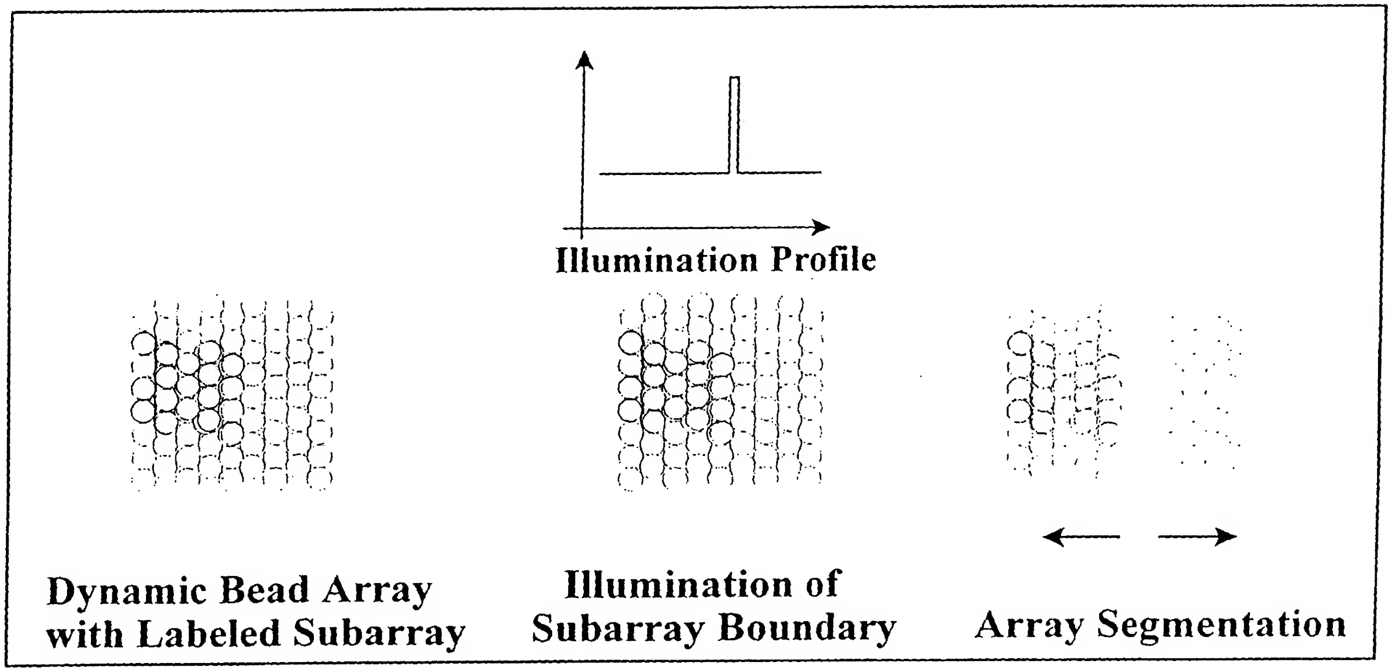


Figure 17

LCD PARSE

Figure 18a

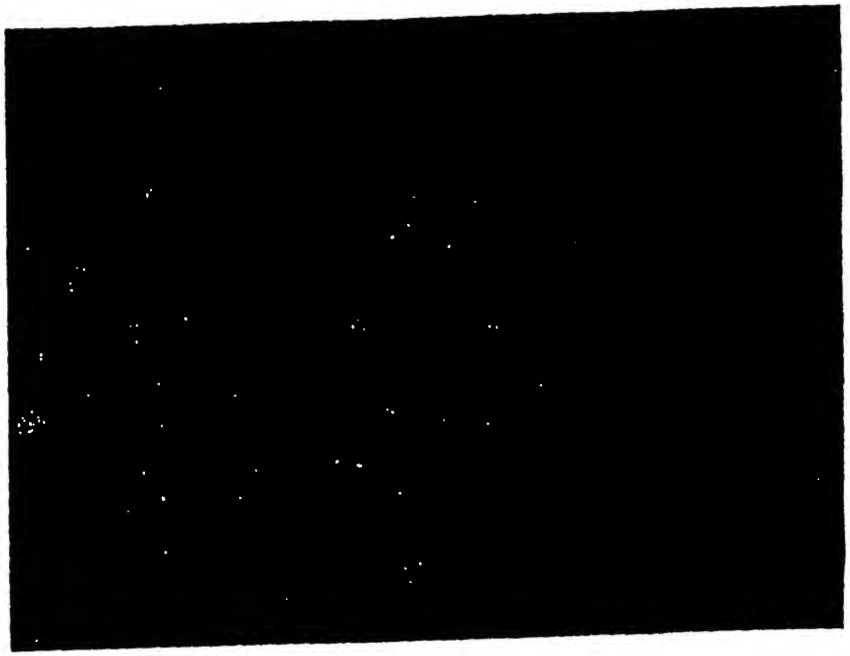


Figure 18b

LCD PARSE

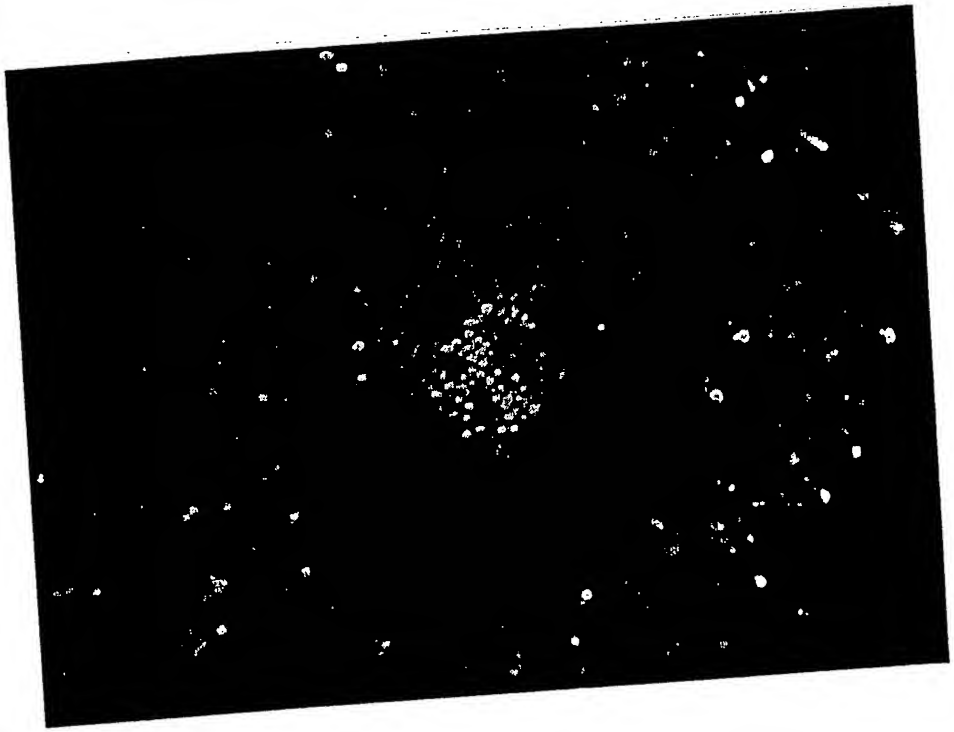
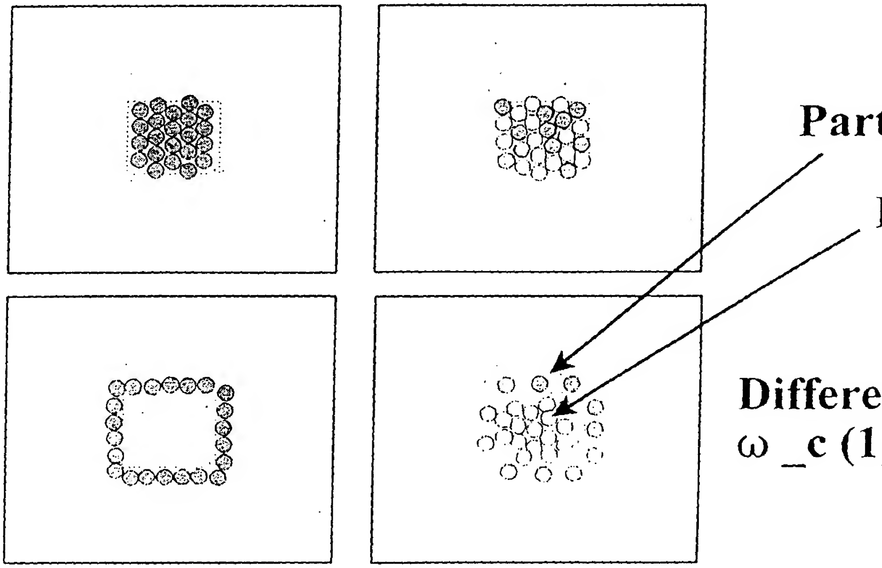


Figure 19

FRACTIONATION

Differential Frequency Dependence of Particle Expulsion
(NOTE: ω_c denotes a characeristic frequency)



Single Particle
(Type 1)

Mixture
(Types 1, 2)

Particle Collection
and Array Assembly
ω < ω_c

Particle Type 1

Particle Type 2

Particle Expulsion
ω _c < ω

Differential Expulsion
ω _c (1) < ω < ω_c (2)

ω_c (Type 1) < ω_c (Type 2)

Figure 20a

FRACTIONATION

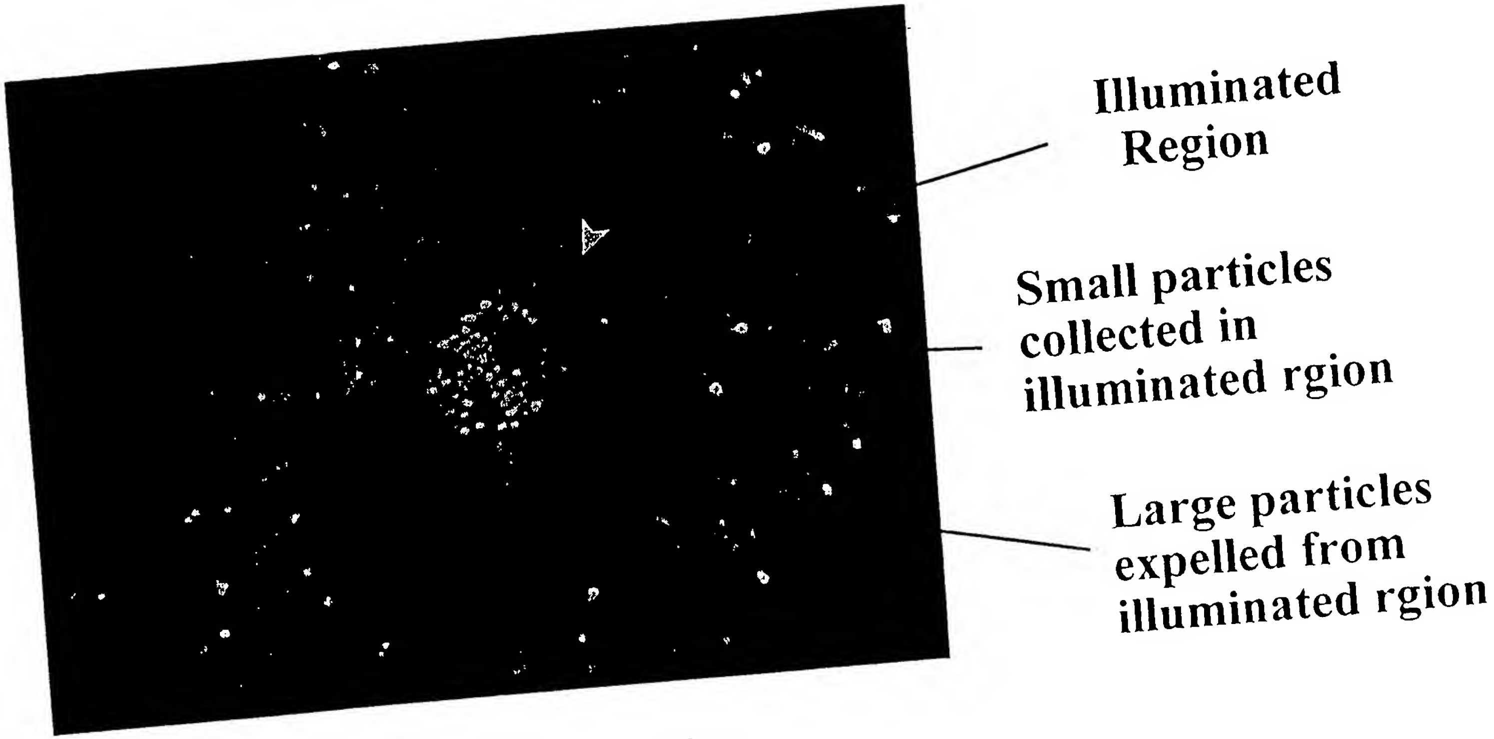


Figure 20b

LCD PARSE

Figure 21a

Figure 21b

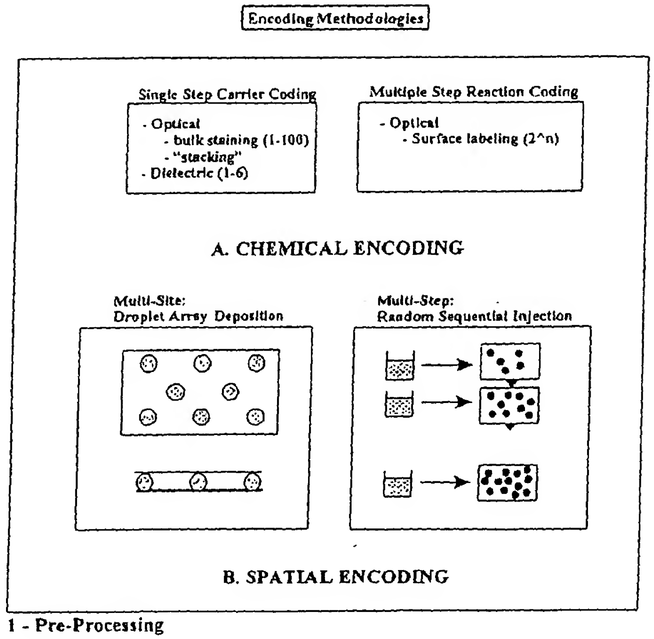


Figure 22a

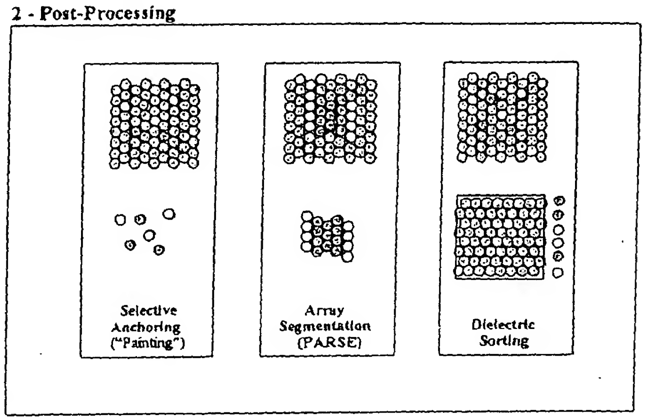


Figure 22b

RANDOM SEQUENTIAL INJECTION

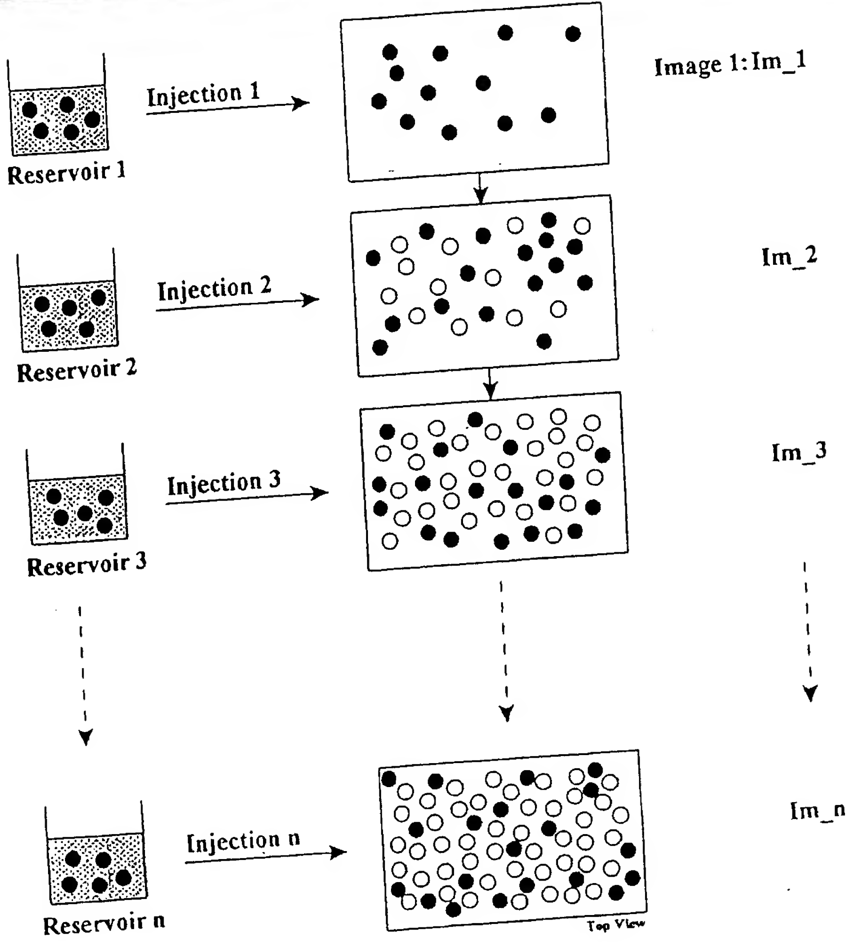


Figure 23

SEQUENTIAL INJECTION &
LIGHT-CONTROLLED ARRAY PLACEMENT

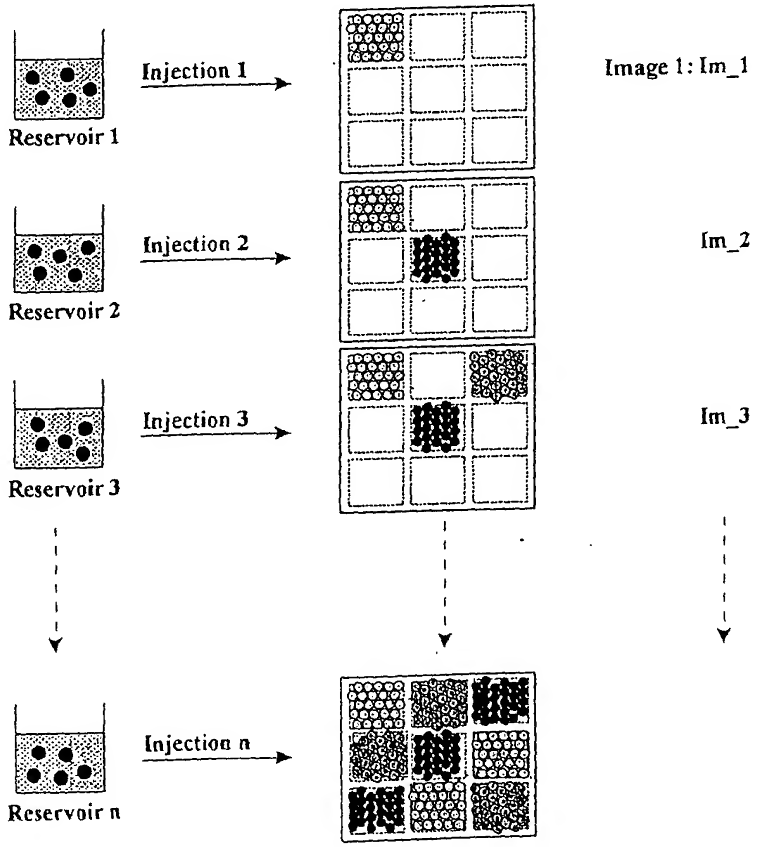


Figure 24

MACRO-TO-MICRO TANSITION

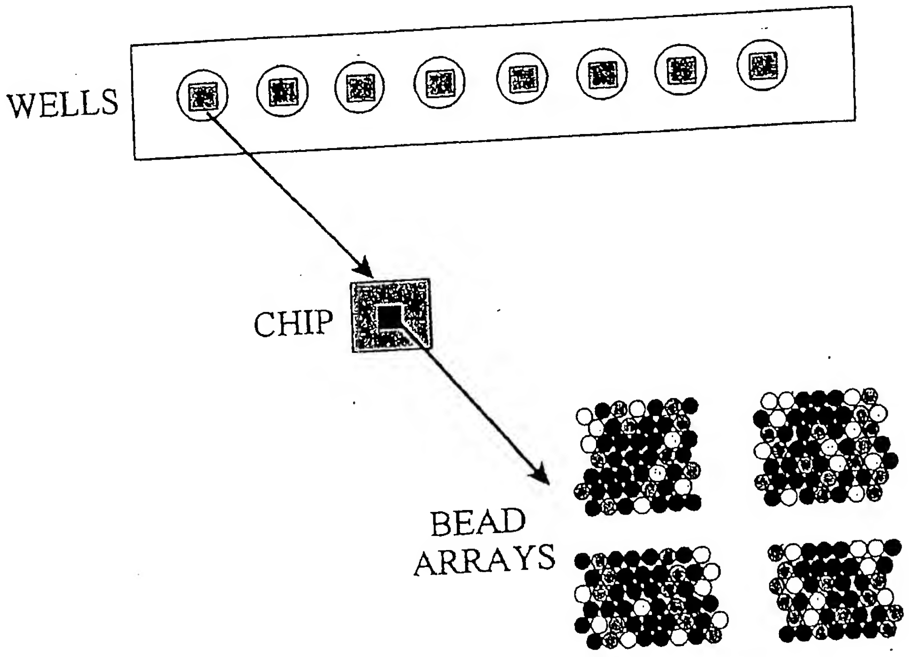


Figure 25a

ARRAY ENCODING

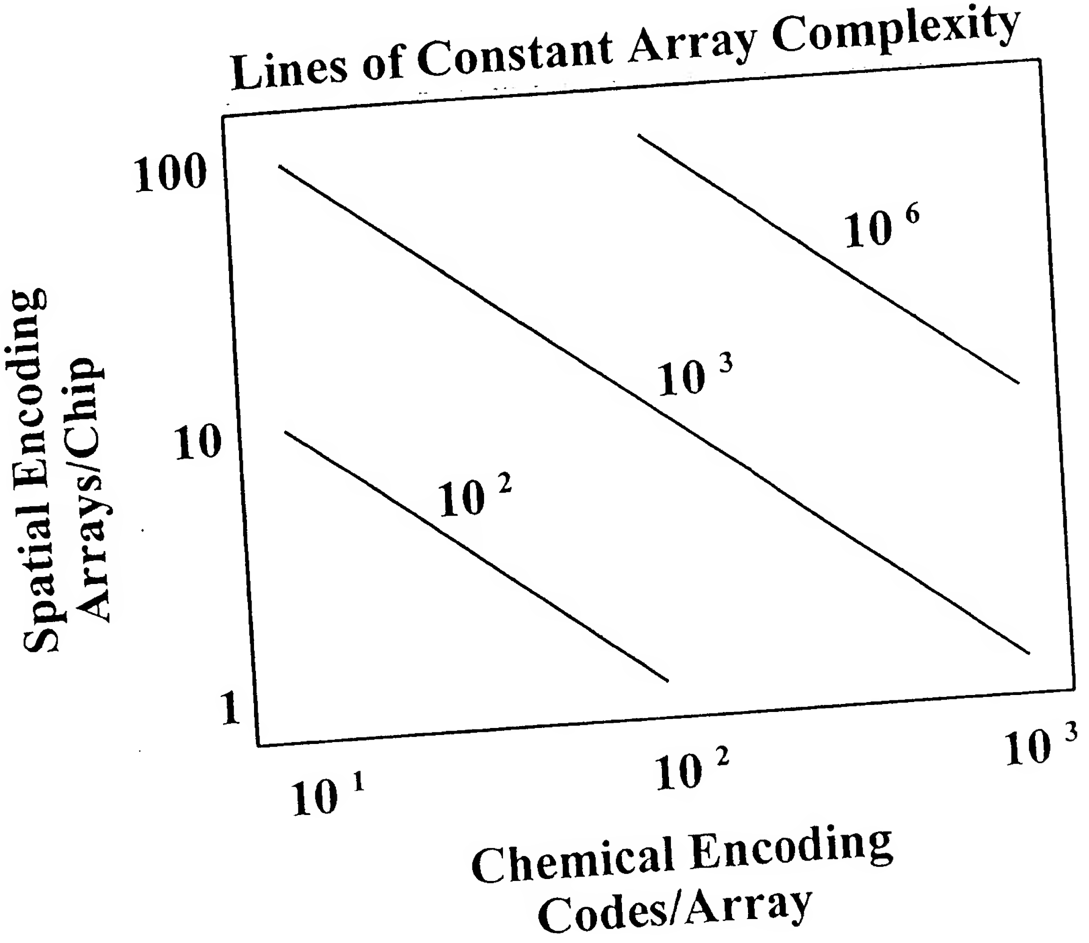


Figure 25b

ARRAY ENCODING

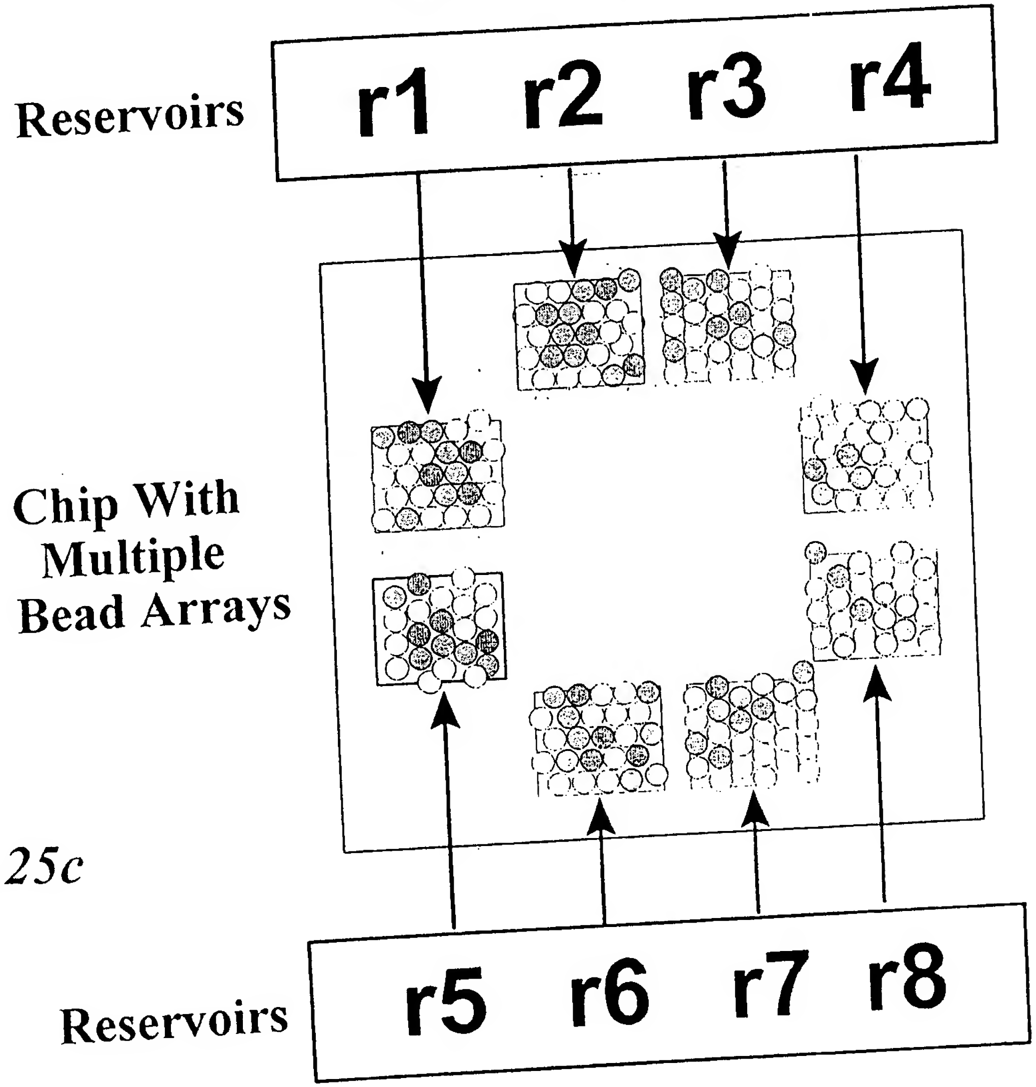


Figure 25c

SEQUENTIAL ASSEMBLY: “BANDING”

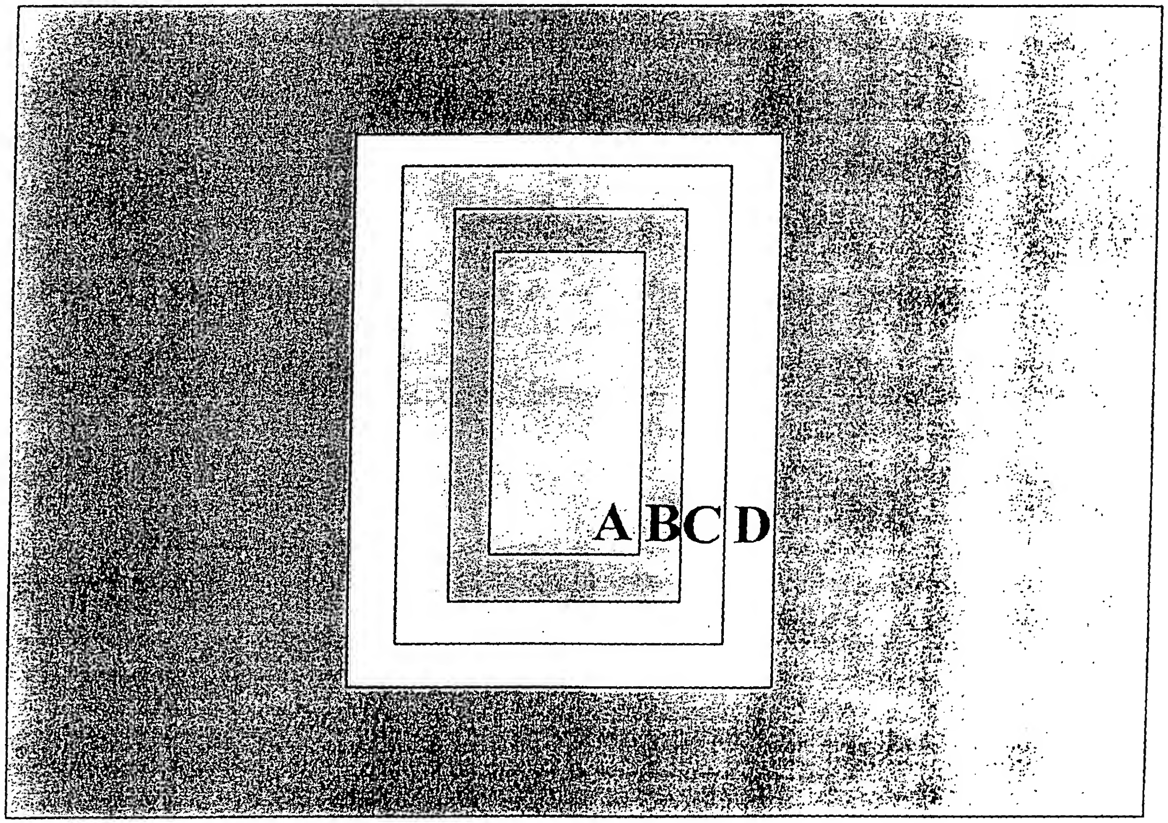


Figure 26a

SEQUENTIAL ASSEMBLY: “BANDING”

Mixture of Two Particle Types

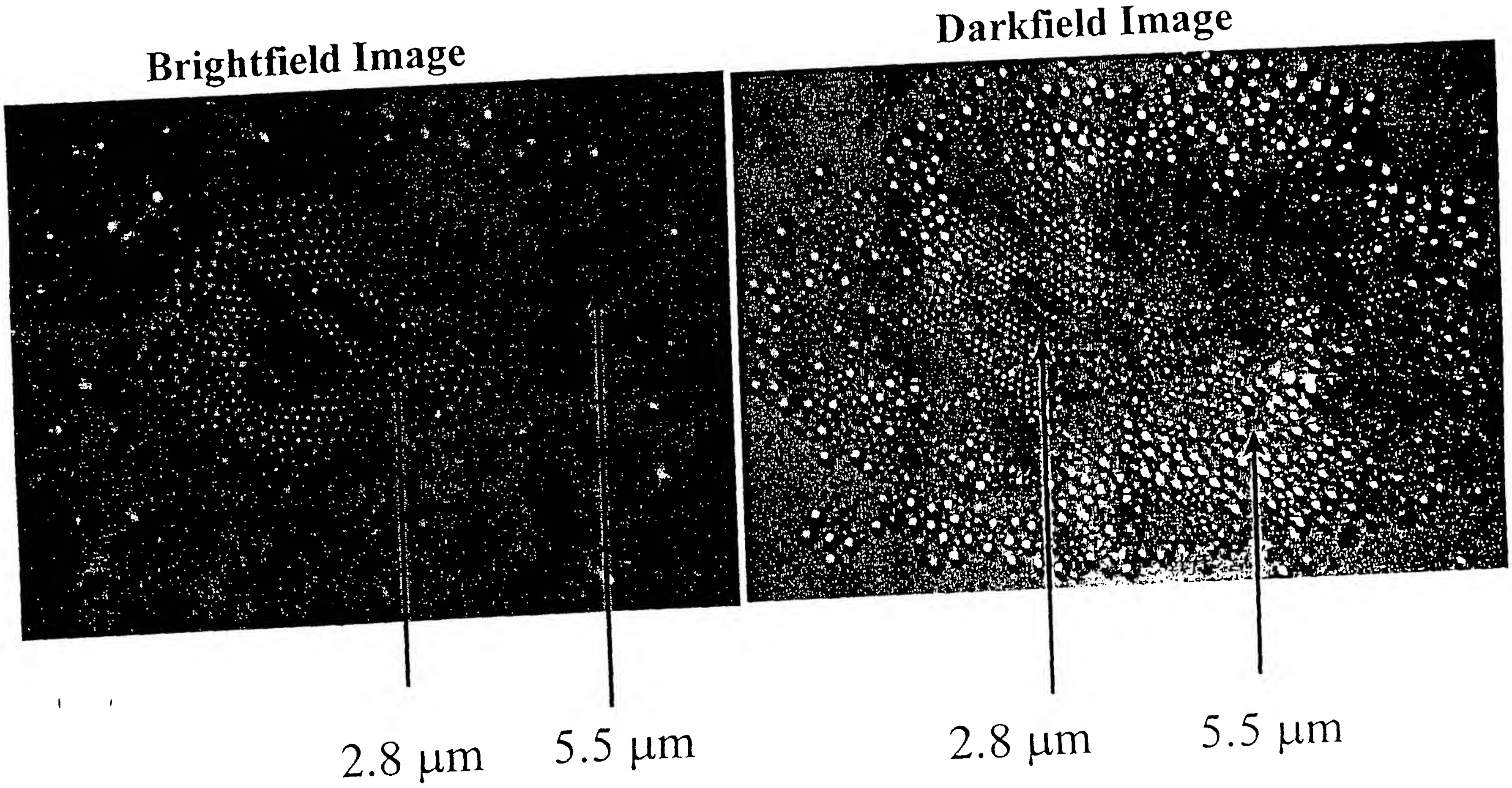


Figure 26b

LCD PARSE

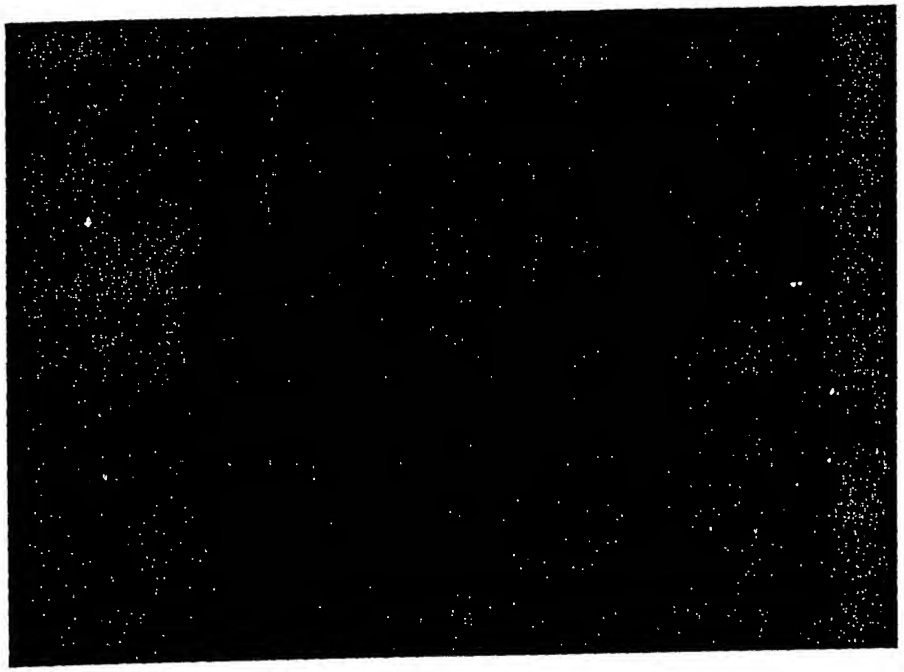


Figure 27

ARRAY OF RANDOM SUBARRAYS

A UNIQUE TWO-DIMENENSIONAL BAR CODE

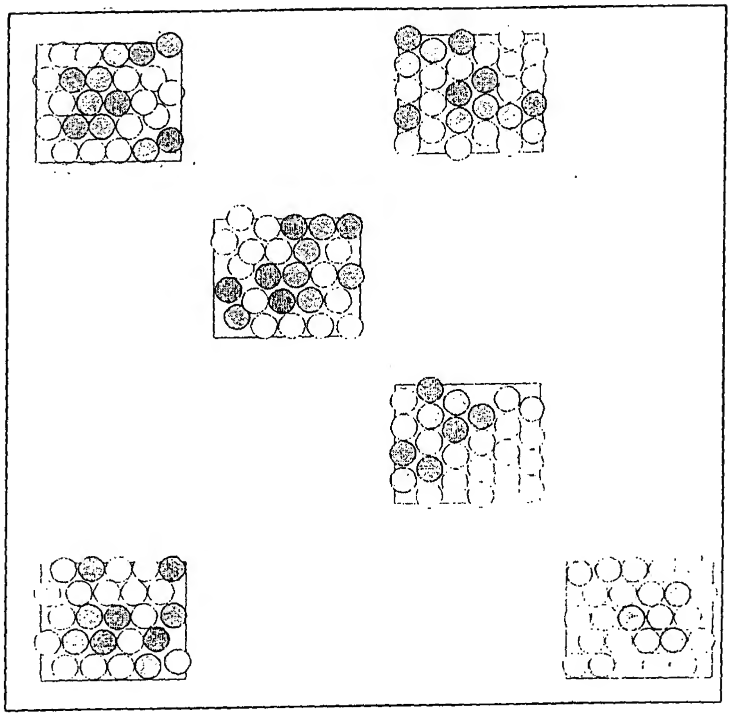


Figure 28

LIGHT-INDUCED FLUID FLOW

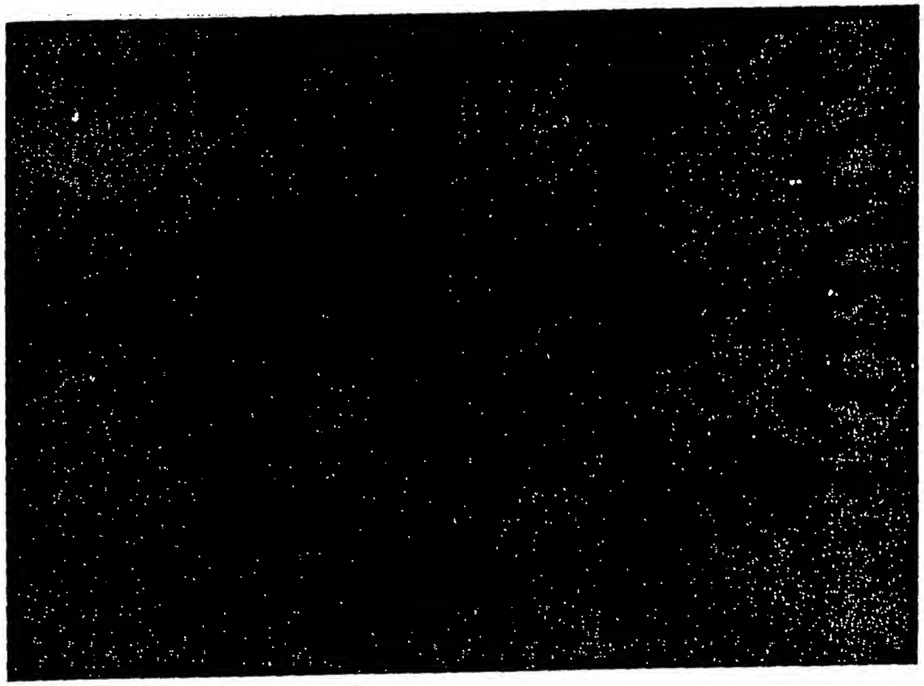


Figure 29